Environmental Product Declaration

DECORATIVE HARDWOODS Association
Natural. Crafted. Responsible.
Formerly HPVA®

nwfa
National Wood Flooring Association

Cradle-to-grave EPD for industry average engineered wood flooring products.

ASTM INTERNATIONAL

According to
EN 15804
ISO 21930
ISO 14025

Photography by: Emily Hagopian
Flooring Products: Nydree Flooring

Summary Results – Landfilling per m^2 ***Full Results in Tables 1-3***		**Cradle-to-Grave Total**
Global Warming Potential, Total	kg CO_2e	11.41
Global Warming Potential, Fossil	kg CO_2e	39.33
Global Warming Potential, Biogenic	kg CO_2e	-27.91
Ozone Depletion	kg CFC11e	7.4E-06
Acidification	kg SO_2e	0.25
Eutrophication	kg Ne	0.25
SFP (Smog)	kg O_3e	3.23
Non-renewable Energy	MJ, NCV	625.57

1.0 General Information

EPD Program and Program Operator	**ASTM International** 100 Barr Harbor Drive PO Box C700 West Conshohocken, PA, 19428-2959 USA www.astm.org ASTM INTERNATIONAL Helping our world work better
General Program Instructions and Version Number	ASTM Program Operator for Product Category Rules (PCR) and Environmental Product Declarations (EPDs) - General Program Instructions, version: 6.0
Manufacturer	**Decorative Hardwoods Association** 42777 Trade West Dr Sterling, VA 20166 https://decorativehardwoods.org DECORATIVE HARDWOODS Association Natural. Crafted. Responsible. Formerly HPVA® **National Wood Flooring Association** 111 Chesterfield Industrial Blvd. Chesterfield, MO 63005 https://nwfa.org nwfa National Wood Flooring Association
Declaration Number	EPD 392
Declared Product	Engineered Wood Flooring
Functional Unit	1 m^2 of engineered wood flooring installed in a building for 75 years.
Reference PCR and Version Number	**ISO 21930:2017** Sustainability in Building Construction — Environmental Declaration of Building Products. [7] **UL Environment**: Product Category Rules for Building-Related Products and Services **Part A:** Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report, v3.2 [11] **Part B:** Part B: Flooring EPD Requirements UL 10010-7
Markets of Applicability	Construction Sector, Flooring

Date of Issue	25.11.2022
Period of Validity	25.11.2027
EPD Type	Industry Average EPD
EPD Scope	Cradle-to-Grave
Year of reported manufacturer primary data	2019
LCA Software	SimaPro v8.5
LCI Databases	USLCI [9], Ecoinvent 3.5 [15], Datasmart [8]
LCIA Methodology	TRACI 2.1 [3]
The sub-category PCR review was conducted by:	Jack Geibig, Chair Ecoform Dr. Thomas Gloria Industrial Ecology Consultants Thaddeus Owen
LCA and EPD Developer This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:	**Coldstream Consulting LTD** Box 201 Revelstoke, British Columbia Canada V0E 2S0 www.coldstreamconsulting.com James Salazar
This declaration was independently verified in accordance with **ISO 14025:2006[4]**. The **UL Environment "Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report," v3.2** (September 2018), based on **ISO 21930:2017 and CEN Norm EN 15804 (2012),** serves as the core PCR, with additional considerations from the **USGBC/UL Environment Part A Enhancement (2017)**. ☐ INTERNAL x EXTERNAL	
Independent Verifier This life cycle assessment was independently verified in accordance with ISO 14044 [6] and the reference PCR by:	**Tim Brooke** 100 Barr Harbor Drive PO Box C700 West Conshohocken, PA, 19428-2959 USA www.astm.org
Limitations 1.0 Environmental declarations from different programs (ISO 14025) may not be comparable. 2.0 Comparison of the environmental performance of Flooring Products using EPD information shall be based on the products use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the building energy use phase as instructed under this PCR. 3.0 Full conformance with the PCR for Products allows EPD comparability only when all stages of the life cycle have been considered. However, variations and deviations are possible" Example of variations: Different LCA software and background LCI datasets may lead to different results for upstream or downstream of the life cycle stages declared.	

LCA and EPD Manufacture Participants	
AACER	AHF PRODUCTS
APPALACHIAN APPALACHIAN FLOORING	MULLICAN HARDWOOD FLOORING
Nydree FLOORING	OWENS FLOORING by Quanex Building Products
Shaw FLOORS	SHEOGA
WD	

About the Decorative Hardwoods Association

Founded in 1921, the Decorative Hardwoods Association, formerly known as Hardwood Plywood and Veneer Association, represents the hardwood plywood, hardwood veneer, and engineered hardwood flooring industries. Together we produce 90% of the hardwood plywood stock panels and hardwood veneer manufactured in North America. More information can be found at decorativehardwoods.org.

About the National Wood Flooring Association

The National Wood Flooring Association (NWFA) is an international not-for-profit trade association. The NWFA represents all segments of the wood flooring industry including manufacturers, distributors, retailers, installers, importers/exporters, inspectors, and consultants. The mission of the not-for-profit organization is to unify and strengthen the wood flooring community through technical standards, education, networking, and advocacy. NWFA accomplishes this through various programs and services, such as hands-on training, an annual Wood Flooring Expo, Hardwood Floors magazine, and technical standards and publications that are recognized worldwide. More information about NWFA can be found at nwfa.org.

2. PRODUCT DESCRIPTION

Wood
Wood is the hard fibrous material that forms from the main substance of the trunk or branches and beneath the bark of a tree.

Wood Flooring
A wood floor is any flooring product that contains real wood as the top-most, wearable surface of the floor. Wood floors come in many different options. These include, but are not limited to: hardwood/softwood, domestic/imported, solid/engineered, jobsite-finished/factory-finished, strip/plank/wide plank/parquet, newly harvested/antique reclaimed/recycled/salvaged, saw cut, grade, specie, length, thickness, profile, and finish type.

Engineered Wood Flooring
Engineered wood flooring has a real wood wear layer that the consumer can see, touch, and experience. It normally is made using multiple wood veneers or slats of wood glued together under pressure at opposing directions, or a variety of composites for core material such as MDF. This study inventories a mix of engineered wood flooring products, and composite engineered wood flooring products made from wood-based composite platform materials. The thickness of the finished product can range from 3/8" to ¾", and is available widely in all thicknesses. The thickness of the top wood veneer typically determines if an engineered wood floor can be sanded and refinished, and how many times. Wood flooring is classified as strip if it has a face width less than 3 inches, plank if it has a face width between 3 and 5 inches, and wide plank if it has a face width more than 5 inches. Parquet flooring is any pattern that is geometric in shape as opposed to linear. Herringbone, Chevron, and the traditional square-shaped finger-block pattern are examples of common parquet patterns. Figure 1 provides a visual representation of the product.

U.S. Forests
In the United States, the most-common domestic hardwood species used to produce engineered wood flooring include red oak, white oak, hard (sugar) maple, hickory, pecan, cherry, birch, walnut, ash, and beech. Red oak and white oak are the dominant species in the U.S. hardwood forests, and therefore comprise the majority of engineered hardwood flooring production.

Studies show hardwood used to make flooring is harvested sustainably in the United States. In fact:

- Net annual growth in U.S. commercial hardwood forests exceeds harvest and mortality by 33% each year.
- The volume of U.S. hardwood growing stock increased by more than 130%, from 5.2 billion m3 in 1953 to 12 billion m3 in 2012.
- The total annual growth of U.S. hardwood species is just more than 272 million m3.
- Hardwoods generally are harvested selectively a few trees at a time, not using large clear- cutting processes.

Figure 1: Installed engineered hardwood flooring

3. METHODOLOGY

The underlying LCA [5] investigates the lifecycle stages of engineered hardwood flooring production in the United States from cradle-to-grave with all modules included.

System Boundaries and Product Flow Diagram

The scope (Figure 2) covered resource extraction [A1], resource transportation [A2], and manufacturing of products [A3], transportation of products [A4], installation of products [A5], use [B1-B7], disposal at the end-of-life [C1-C4], and potential benefits [D] beyond system boundaries. All inputs (material, fuel, and energy), outputs (product and co-products), and direct emissions to air, water, and land were included in the development of LCI and LCIA. Indirect emissions from the consumption of materials were included in secondary datasets.

Building Life Cycle Information Modules																
Production stage			Construction Stage		Use stage							End-of-life stage				Substitution Effects
Extraction and upstream production	Transport to factory	Manufacturing	Transport to site	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	De-Construction/ Demolition	Transport to waste processing or disposal	Waste processing	Disposal	Benefits Outside System
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Figure 2: Life Cycle Stages and Information Modules per ISO 21930:2017

Construction and Service Life Assumptions

The product system includes average assumptions as to the transportation of the product to the construction site, 167 miles [13] as well as construction energy use [2]. The reference service life for the product is 25 years. The LCA report presents scenarios with and without vacuuming to show the significant results variability depending on the service life assumptions. This EPD presents the results for an estimated building service life of 75 years, meaning the product is replaced twice to meet the functional unit service requirement. To access the data for the with vacuuming scenario please refer to the LCA report. [2]

Benefits Outside the System Boundary

Module D estimates the benefits outside the system boundary, natural gas displacement and the avoidance of producing plywood for future construction projects. To estimated natural gas displacement, we first calculated the potential fuel higher heating value of the product based on a higher heating value of 20.9 MJ/odkg [2]. The energy equivalent amount of natural gas was calculated based on a higher heating value or 38.66 MJ/m3 [9].

Functional Unit

The functional unit for the product is “*one square meter average engineered wood flooring installed in a building for 75 years*”.

Data Sources

Primary and secondary data sources, as well as the respective data quality assessment are documented in the underlying LCA project report [2] in accordance with UL PCR 2018.

Treatment of Biogenic Carbon and Sustainable Forest Management Certification

Biogenic carbon emissions and removals are reported in accordance with ISO 21930 7.2.7. and 7.2.12. Detailed information is provided in Section 5.1 of the underlying LCA [2].

ISO 21930 requires a demonstration of forest sustainability to characterize carbon removals with a factor of -1 kg CO2e/kg CO2. ISO 21930 Section 7.2.11 Note 2 states the following regarding demonstrating forest sustainability: “Other evidence such as national reporting under the United Nations Framework Convention on Climate Change (UNFCCC) can be used to identify forests with stable or increasing forest carbon stocks.” The United States UNFCCC annual report Table 6-1 provides annual NET GHG Flux Estimates for different land use categories. This reporting indicates non-decreasing forest carbon stocks and thus the source forests meet the conditions for characterization of removals with a factor of -1 kg CO2e/kg CO2.

The Landfill Modeling for Biogenic Carbon is based on the United States EPA WARM model. The WARM model accounts for decomposition and emissions of landfill gas as a portion of the initial carbon in the product. WARM Model documentation: https://www.epa.gov/warm/documentation-waste-reduction-model-warm.

4. LCA Results

The results are presented for both the average end-of-life treatment, as well as individual scenarios for incineration with energy recovery and landfilling. The U.S. Environmental Protection Agency’s Materials Management Fact Sheet estimates 0% recycling, 18% combustion with energy recovery and 82% landfilling as the average end-of-life treatment for durable wood products; this average treatment was adopted.

The impact categories and characterization factors (CF) are from the U.S. EPA Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts -TRACI 2.1 [6]. SimaPro v8.5 [10] was used to accumulate the LCI data and to calculate the LCIA results.

The total primary energy consumption was based on Cumulative Energy Demand [18]. Lower heating value of primary energy carriers was used to calculate the primary energy values. Other inventory parameters concerning material use, waste, water use and biogenic carbon were drawn from the LCI results. ACLCA’s Guidance to Calculating non-LCIA Inventory Metrics was followed in accordance with ISO 21930:2017 [1].

Table 1 presents the cradle-to-gate results. Table 2 and Table 3 present results for 100% landfilling and 100% incineration respectively.

Table 1: Cradle-to-gate Results for 1.0 m^2 of engineered wood flooring

Core Mandatory Impact Indicator	Indicator	Unit	A1-A3	A1	A2	A3
Global warming potential – Total	GWP_{TOTAL}	kg CO2e	6.849	-30.192	0.666	36.375
Global warming potential - Fossil	GWP_{FOSSIL}	kg CO2e	6.849	0.215	0.666	5.968
Global warming potential - Biogenic	$GWP_{BIOGENIC}$	kg CO2e	0.000	-30.407	0.000	30.407
Ozone depletion potential	ODP	kg CFC11e	1.13E-06	8.84E-12	2.54E-11	1.13E-06
Acidification potential of soil and water sources	AP	kg SO2e	0.040	0.003	0.004	0.033
Eutrophication potential	EP	kg Ne	0.030	0.000	0.000	0.029
Formation potential of tropospheric ozone	SFP	kg O3e	0.709	0.093	0.108	0.508
Abiotic depletion potential (ADPfossil)	ADPf	MJ, NCV	63.869	2.980	8.565	52.323
Fossil fuel depletion	FFD	MJ Surplus	5.907	0.444	1.276	4.187
Use of Primary Resources						
Renewable primary energy used as energy	RPRE	MJ, NCV	53.253	0.000	0.000	53.253
Renewable primary energy used as material	RPRM	MJ, NCV	31.494	31.494	0.000	0.000
Non-renewable primary energy used as energy	NRPRE	MJ, NCV	91.732	2.876	8.604	80.253
Non-renewable primary energy used as material	NRPRM	MJ, NCV	0.000	0.000	0.000	0.000
Secondary Material, Secondary Fuel and Recovered Energy						
Secondary material	SM	kg	0.00	0.00	0.00	0.00
Renewable secondary fuel	RSF	MJ, NCV	39.208	0.000	0.000	39.208
Non-renewable secondary fuel	NRSF	MJ, NCV	0.00	0.00	0.00	0.00
Recovered energy	RE	MJ, NCV	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters						
Consumption of freshwater resources	FW	m3	0.007	0.005	0.000	0.001
Indicators Describing Waste						
Hazardous waste disposed	HWD	kg	0.002	0.000	0.000	0.002
Non-hazardous waste disposed	NHWD	kg	0.127	0.006	0.000	0.122
High-level radioactive waste	HLRW	m3	3.06E-09	1.08E-09	2.68E-11	1.95E-09
Intermediate- and low-level radioactive waste	ILLRW	m3	1.58E-10	9.74E-12	1.29E-10	1.89E-11
Components for re-use	CRU	kg	0.00	0.00	0.00	0.00
Materials for recycling	MR	kg	0.00	0.00	0.00	0.00
Materials for energy recovery	MER	kg	0.00	0.00	0.00	0.00
Recovered energy exported	EE	MJ, NCV	0.00	0.00	0.00	0.00

Table 2: Cradle-to-Grave Results for 1.0 m² of engineered wood flooring – Landfilling End-of-Life Treatment

Core Mandatory Impact Indicator	Indicator	Unit	A-C	A-D	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4, Landfill	D, Landfill
Global warming potential – Total	GWP_{TOTAL}	kg CO2e	11.41	11.41	-4.87	0.48	0.15	0.00	12.26	3.28	-2.70	0.00	0.00	0.00	0.00	0.10	0.00	2.71	0.00
Global warming potential - Fossil	GWP_{FOSSIL}	kg CO2e	39.33	39.33	6.85	0.48	0.15	0.00	12.26	3.28	15.91	0.00	0.00	0.00	0.00	0.10	0.00	0.29	0.00
Global warming potential - Biogenic	$GWP_{BIOGENIC}$	kg CO2e	-27.91	-27.91	-11.72	0.00	0.00	0.00	0.00	0.00	-18.61	0.00	0.00	0.00	0.00	0.00	0.00	2.41	0.00
Depletion potential of the stratospheric ozone layer	ODP	kg CFC11e	7.4E-06	7.4E-06	1.1E-06	8.1E-10	9.1E-10	0.0E+00	1.6E-06	2.5E-06	2.3E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.6E-10	0.0E+00	3.9E-09	0.0E+00
Acidification potential of soil and water sources	AP	kg SO2e	0.25	0.25	0.04	0.00	0.00	0.00	0.09	0.02	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eutrophication potential	EP	kg Ne	0.25	0.25	0.03	0.00	0.00	0.00	0.03	0.01	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00
Formation potential of tropospheric ozone	SFP	kg O3e	3.23	3.23	0.71	0.08	0.01	0.00	0.55	0.17	1.71	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.00
Abiotic depletion potential (ADPfossil)	ADPf	MJ, NCV	493.18	493.18	63.87	6.06	1.48	0.00	123.66	148.22	148.31	0.00	0.00	0.00	0.00	1.22	0.00	0.37	0.00
Fossil fuel depletion	FFD	MJ Surplus	58.78	58.78	5.91	0.91	0.07	0.00	15.51	21.90	14.24	0.00	0.00	0.00	0.00	0.18	0.00	0.05	0.00
Use of Primary Resources																			
Renewable primary energy used as energy	RPRE	MJ, NCV	210.43	210.43	53.25	0.01	0.02	0.00	3.85	0.99	152.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Renewable primary energy used as material	RPRM	MJ, NCV	31.49	31.49	31.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-renewable primary energy used as energy	NRPRE	MJ, NCV	625.57	625.57	91.73	6.52	1.60	0.00	157.48	160.90	205.60	0.00	0.00	0.00	0.00	1.31	0.00	0.42	0.00
Non-renewable primary energy used as material	NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy																			
Secondary material	SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Renewable secondary fuel	RSF	MJ, NCV	117.62	117.62	39.21	0.00	0.00	0.00	0.00	0.00	78.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-renewable secondary fuel	NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recovered energy	RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters																			
Consumption of freshwater resources	FW	m3	0.41	0.41	0.01	0.00	0.00	0.00	0.37	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Indicators Describing Waste																			
Hazardous waste disposed	HWD	kg	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-hazardous waste disposed	NHWD	kg	0.38	0.38	0.13	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High-level radioactive waste	HLRW	m3	2.5E-08	2.5E-08	3.1E-09	4.8E-11	1.3E-11	0.0E+00	1.4E-08	2.0E-09	6.3E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	9.6E-12	0.0E+00	1.7E-11	0.0E+00
Intermediate- and low-level radioactive waste	ILLRW	m3	4.9E-07	4.9E-07	1.6E-10	2.3E-10	6.5E-11	0.0E+00	6.5E-08	4.2E-07	1.2E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.6E-11	0.0E+00	8.1E-11	0.0E+00
Components for re-use	CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for recycling	MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recovered energy exported	EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 3: Cradle-to-Grave Results for 1.0 m^2 of engineered wood flooring – Incineration End-of-Life Treatment

Core Mandatory Impact Indicator	Indicator	Unit	A-C	A-D	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4, Incineration	D, Incineration
Global warming potential – Total	GWP_{TOTAL}	kg CO2e	39.12	17.83	-4.87	0.48	0.15	0.00	12.26	3.28	15.91	0.00	0.00	0.00	0.00	0.10	0.00	11.80	-21.28
Global warming potential - Fossil	GWP_{FOSSIL}	kg CO2e	39.12	17.83	6.85	0.48	0.15	0.00	12.26	3.28	15.91	0.00	0.00	0.00	0.00	0.10	0.00	0.08	-21.28
Global warming potential - Biogenic	$GWP_{BIOGENIC}$	kg CO2e	0.00	0.00	-11.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.72	0.00
Depletion potential of the stratospheric ozone layer	ODP	kg CFC11e	7.4E-06	7.4E-06	1.1E-06	8.1E-10	9.1E-10	0.0E+00	1.6E-06	2.5E-06	2.3E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.6E-10	0.0E+00	1.3E-12	-4.5E-09
Acidification potential of soil and water sources	AP	kg SO2e	0.25	0.23	0.04	0.00	0.00	0.00	0.09	0.02	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.02
Eutrophication potential	EP	kg Ne	0.21	0.21	0.03	0.00	0.00	0.00	0.03	0.01	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Formation potential of tropospheric ozone	SFP	kg O3e	3.27	2.86	0.71	0.08	0.01	0.00	0.55	0.17	1.71	0.00	0.00	0.00	0.00	0.02	0.00	0.04	-0.40
Abiotic depletion potential (ADPfossil)	ADPf	MJ, NCV	493.97	195.12	63.87	6.06	1.48	0.00	123.66	148.22	148.31	0.00	0.00	0.00	0.00	1.22	0.00	1.16	-298.85
Fossil fuel depletion	FFD	MJ Surplus	58.73	9.02	5.91	0.91	0.07	0.00	15.51	21.90	14.24	0.00	0.00	0.00	0.00	0.18	0.00	0.00	-49.71
Use of Primary Resources																			
Renewable primary energy used as energy	RPRE	MJ, NCV	233.28	233.24	53.25	0.01	0.02	0.00	3.85	0.99	152.30	0.00	0.00	0.00	0.00	0.00	0.00	22.86	-0.04
Renewable primary energy used as material	RPRM	MJ, NCV	31.49	31.49	31.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-renewable primary energy used as energy	NRPRE	MJ, NCV	626.35	294.41	91.73	6.52	1.60	0.00	157.48	160.90	205.60	0.00	0.00	0.00	0.00	1.31	0.00	1.21	-331.94
Non-renewable primary energy used as material	NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy																			
Secondary material	SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Renewable secondary fuel	RSF	MJ, NCV	117.62	117.62	39.21	0.00	0.00	0.00	0.00	0.00	78.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-renewable secondary fuel	NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters																			
Consumption of freshwater resources	FW	m3	0.41	0.41	0.01	0.00	0.00	0.00	0.37	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Indicators Describing Waste																			
Hazardous waste disposed	HWD	kg	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-hazardous waste disposed	NHWD	kg	0.38	0.38	0.13	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High-level radioactive waste	HLRW	m3	2.5E-08	2.5E-08	3.1E-09	4.8E-11	1.3E-11	0.0E+00	1.4E-08	2.0E-09	6.3E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	9.6E-12	0.0E+00	0.0E+00	-1.6E-10
Intermediate- and low-level radioactive waste	ILLRW	m3	4.9E-07	4.9E-07	1.6E-10	2.3E-10	6.5E-11	0.0E+00	6.5E-08	4.2E-07	1.2E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.6E-11	0.0E+00	0.0E+00	-7.8E-10
Components for re-use	CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for recycling	MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recovered energy exported	EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LIMITATIONS

Comparability

Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance using EPD information shall consider all relevant information modules over the full life cycle of the products within the building.

This PCR allows EPD comparability only when the same functional requirements between products are ensured and the requirements of ISO 21930:2017 §5.5 are met. In addition, to be compared EPDs must comply with the same core and sub-category PCRs (Part A and B) and include all relevant information modules. It should be noted that different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared.

Forest Management

While this EPD does not address landscape level forest management impacts, potential impacts may be addressed through requirements put forth in regional regulatory frameworks, ASTM 7612-15 guidance, and ISO 21930 Section 7.2.11 including notes therein. These documents, combined with this EPD, may provide a more complete picture of environmental and social performance of wood products.

While this EPD does not address all forest management activities that influence forest carbon, wildlife habitat, endangered species, and soil and water quality, these potential impacts may be addressed through other mechanisms such as regulatory frameworks and/or forest certification systems which, combined with this EPD, will give a more complete picture of environmental and social performance of wood products.

Scope of the EPD

EPDs can complement but cannot replace tools and certifications that are designed to address environmental impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, etc.

Accuracy of Results

EPDs regularly rely on estimations of impacts; the level of accuracy in estimation of effect differs for any particular product line and reported impact when averaging data.

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